

REMARKS

After entry of the foregoing amendment, claims 1-44 remain pending in the application.

The Related Application Data paragraph has been amended to correct the recited relationship between two of the cases (changing from “division” to “continuation”). A substitute Application Data Sheet is submitted to make this change of record. This change is believed timely since the priority wording is being changed, but not the claim of priority itself.

(A check of PAIR found that the amendment to the priority claim made with the RCE paperwork filed January 24, 2002, does not yet seem to be reflected in the Parent Continuity Data section. The Examiner is requested to have PAIR changed to reflect the correct priority.)

The errors in claims 21 and 33 have been corrected as proposed by the Examiner. Applicant apologizes for these errors.

Claims 22, 30, 34 and 40 have been amended in an editorial manner, but not in response to the outstanding rejection. For example, an “address” has been changed to contact information for the photographer in claim 22. The outstanding formal rejections are believed moot.

The claims stand rejected over Barton (5,646,997) – either individually, or in combination with other art. Barton is understood to embed digital information within digital data, in a manner that avoids detection by a casual observer (Abstract).

Barton suffers from an important drawback: decoding of the embedded data (the payload message data) from an encoded host object (e.g., a digital image) requires that the host object not be changed following encoding. Barton is thus in a class now recognized as “fragile” encoding techniques – any change to the encoded data will prevent decoding.

The fragility of Barton’s encoding is due to his use of a bit-replacement technique, in which particular bits in a representation of the original image are replaced

with corresponding bits from the payload data.¹ Any process that changes the values of the encoded host data thus serves to garble the encoded payload message.

Barton teaches his arrangement is suitable for encoding JPEG and MPEG data, and notes that the JPEG and MPEG compression processes are “lossy” (*c.f.*, col. 4, lines 65-68). However, Barton encodes such data after the lossiness has occurred. Thus, in his discussion of marking JPEG image data (*c.f.*, col. 8, line 30 etc.), he does not process the data in the spatial (pixel) domain. Rather, he waits until the JPEG process first converts the data to the frequency domain, and processes it in various other ways, and finally produces variable length codes (VLCs). It is these variable length codes that Barton alters by substituting bits of his payload message for certain least significant bits of the VLCs (col. 8, lines 46-48). At this stage, the “lossiness” of the process has already been incurred. Subsequent JPEG decompression results in a lossless reconstruction of the image represented by these VLCs.

All this is a long way of saying that Barton’s arrangement has limited utility. It cannot be used to reliably encode pixel image data that is thereafter JPEG processed. It cannot be used to reliably encode image data that is thereafter printed on paper (a process that significantly alters many bits of the original image representation). It cannot be used to reliably encode image data that is thereafter exposed onto emulsion film. Etc., etc. His arrangement requires that the encoded information be kept in its originally encoded, pristine digital form.

An advantage provided by certain embodiments of applicant’s arrangement is that the encoded payload message can be correctly decoded despite alteration of the image that alters the representation of the encoded payload message. (*See, e.g.*, the references in applicant’s specification to surviving various transformations, noise-additions, compressions/decompressions, and other corruptions at page 5, line 31 to page 6, line 3; page 19, line 32 to page 20, line 20; and page 34, line 27 to page 35, line 3.)

Turning to the claims, claim 1 recites “printing the encoded photographic images

¹ *See, e.g.*, Barton at col. 4, lines 16-19 where he notes “*The signature and additional information supplied by the user are embedded into the digital block by replacing predetermined bits within the block.*” Likewise, in his video encoding technique, a bit of the payload is encoded into the least significant bit of the luminance component of three pixels in sequence (col. 10, lines 17-19). Likewise, in his JPEG marking technique, he replaces the least significant bits of certain of the variable length codes, and substitutes bits of the payload data he wishes to convey (col. 8, lines 46-52).

on a common page.” Because *printing* transforms the image out of its pristine digital form, Barton has no utility. An artisan would be led away from employing Barton in any context involving printing, because his encoding would not survive such a printing operation. Rather than *benefiting* an operation involving printing, Barton would simply add complexity – yielding nothing useful. Accordingly, an artisan would not employ Barton in the arrangement detailed in claim 1, or any of the claims dependent thereon.

A similar shortcoming arises in connection with claims 27 and 39, which also involve transforming the steganographic message out of its pristine digital form – here by exposing onto emulsion media. (These claims have been rewritten into independent form.)

Independent claim 11 has been amended to highlight this advantage over Barton – reciting that the steganographic message “can be correctly decoded despite alteration of the image that alters a representation of the steganographic message therein.”

Independent claims 18, 30 and 40 have been similarly amended.

In view of the foregoing, other points that might be made concerning the patentability of the claims, and the shortcomings of the cited references and their proposed combinations, need not be belabored.

Favorable reconsideration and passage to issuance are solicited. Nevertheless, the Examiner is invited to contact the undersigned if any questions arise.


Date: November 16, 2004

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Respectfully submitted,

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